A Framework for Implementing Sea Power 21 Through Sea Trial

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Navy Warfare Development Command

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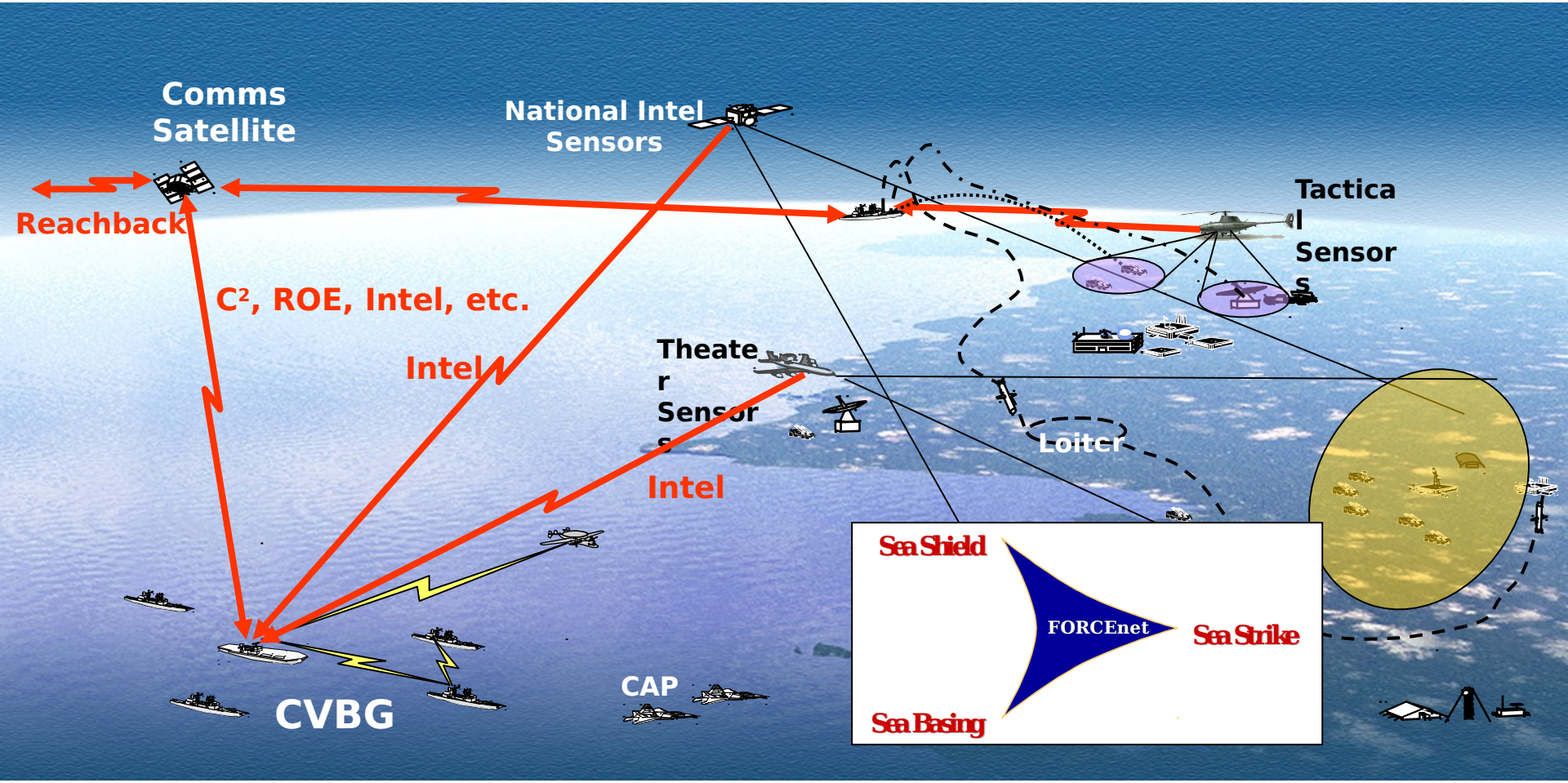
MITRE C3I FFRDC

Version 0.9

Sea Power 21 Implementation
- Sea Trial Translates Vision into Reality



… through operational experimentation.

Sea Power 21

"Under the guidance of Commander Fleet Forces Command, (CFFC) the Navy Warfare Development Command (NWDC) will serve as Project Coordinator for the Sea Trial Process. Assigned responsibility for the development of Sea Strike, Sea Shield and Sea Basing, CFFC will reach throughout the military and beyond to coordinate technology and concept development in support of the future Navy vision.

This effort will result in a menu of technological and conceptual options to further development of the Sea Strike, Sea Shield and Sea Basing Concepts. NWDC will work closely with the Program Executive Offices, Systems Commands and designated units to integrate these options into practice, developing and testing capabilities in Fleet Battle Experiments and Joint Exercises, culminating in operational deployments."

Gordon England
Secretary of the Navy

Vern Clark, Admiral USN
Chief of Naval Operations

James L. Jones, General USMC
Commandant of the Marine Corps

Sea Trial Implementation

- **Formalize the experimentation process with the Fleet as a major partner.**
- **Fully integrate concept development and technology insertion into Fleet experimentation.**

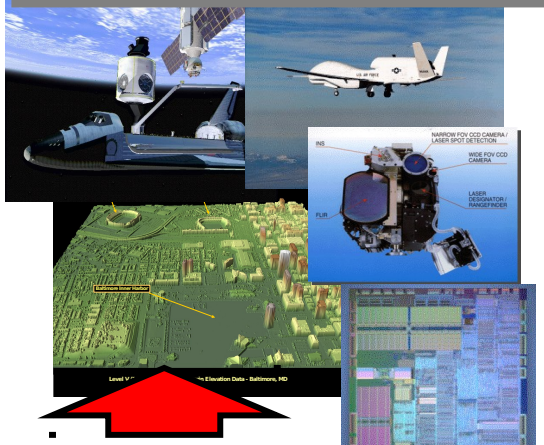
"The goal is to speed the delivery of state-of-the-art warfighting capabilit to our sailors." CNO P4 011515Z OCT

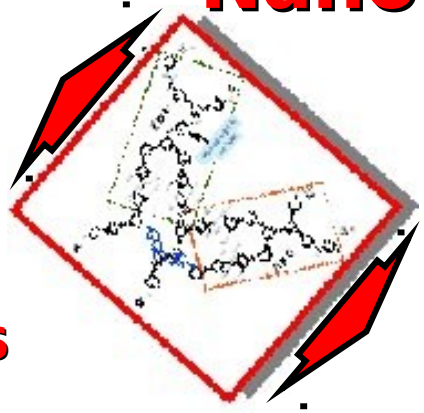
What Do we Want out of Sea Trial?
(i.e., desired outcomes)

- **CNO**
  - **I'm expecting this to formalize experimentation**
  - **I'm expecting this to be a new way of life**
  - **I'm expecting this to be "Fleet led"**
  - **I'm expecting Fleet and R&D to work together**
  - **I'm expecting the timelines to shrink (i.e. "speed to capability")**
- **CFFC**
  - **"The Process" = Accountability and Oversight**
  - **Define formal products = Outcomes**
  - **POA&M = A Timeline**

Transformation is a Random Walk Without Purpose…

Remote & Close-Access Sensing

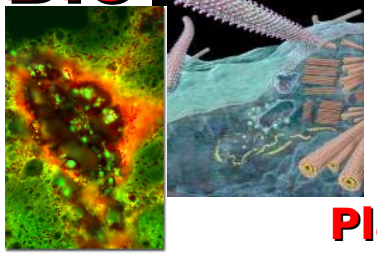




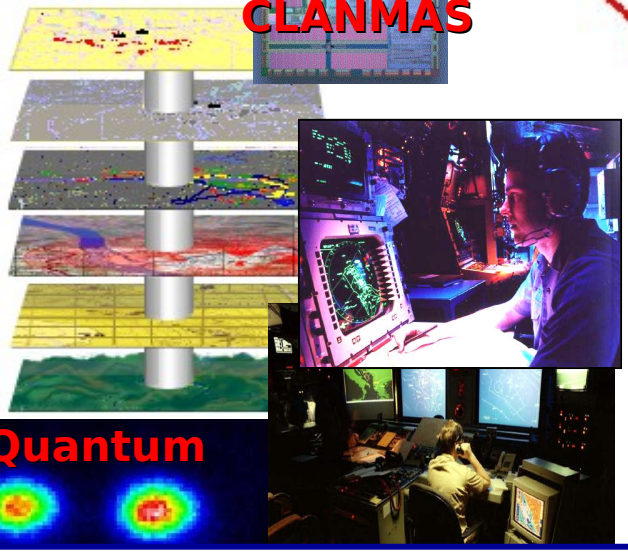
- "The Next Big Thing"
- The Next "Breakthrough Concept"
- The Next "Vision"

Nano

Bio

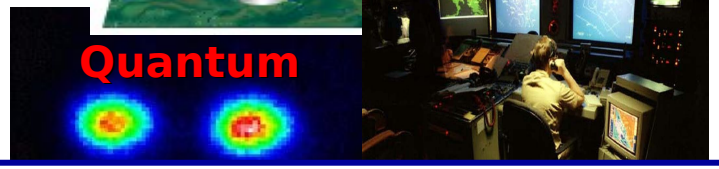


CLANMAS



Plasma & Super-fluid Propagati

Quantum



Stealth

Precision

Autonomy

Powerful, Pervasive Computin Materials, Propulsion & "Smarts"

Providing Purpose Requires Answering These Key Questions

- **Why** transform?
  - What are "the critical emerging *challenges*" for the Force ?
  - What *revolutionary advantage* could future maritime forces hold over our anticipated adversaries?

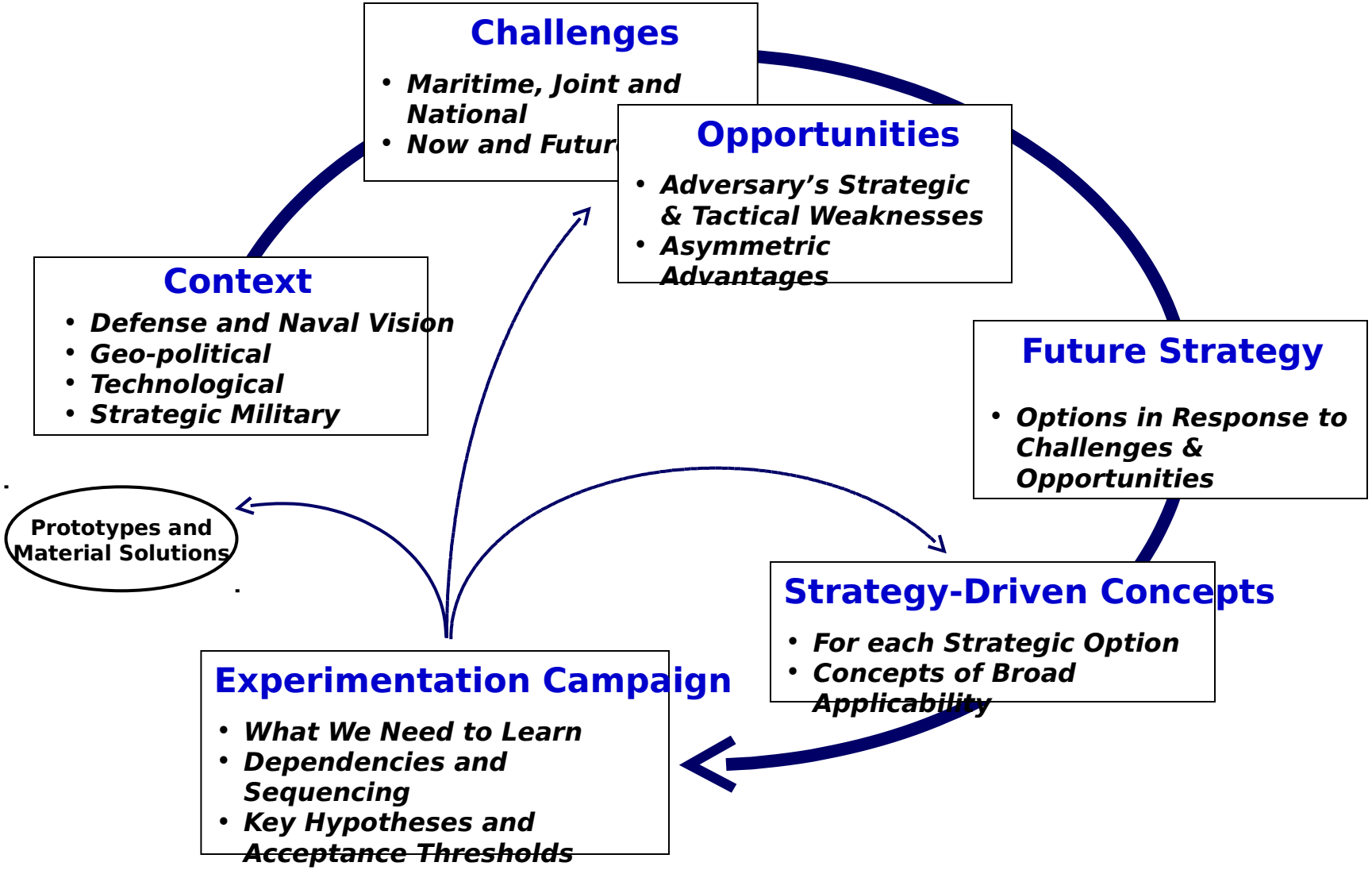
- **What** are the "plausible operational *concepts*" …
  - To meet these challenges?
  - To seize these advantages?
  - How will we evolve and refine them?

- **What**, *capabilities* must it possess to enable these concepts? How will we design and develop them?

- **How** will we *implement* these capabilities?

- **When** should its various capabilities (both material & CONOPs) mature?
  - **How much** money will be needed … when *(investment strategies)*?
  - How should we *organize* the efforts and *change the military culture* in order to develop and deploy these capabilities?

Strategy-Driven Concept Development Process (The Journey)



Proposed Future Navy Strategy

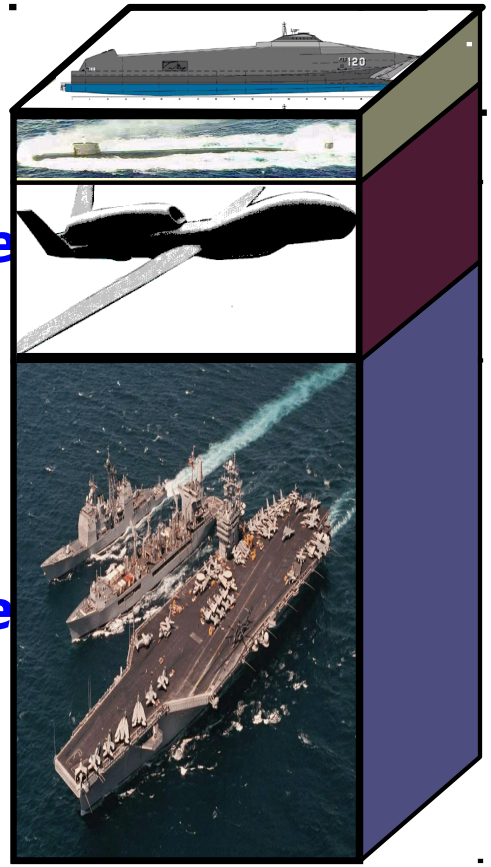
(Force Survival & Effective Power Projection)

Hybrid Force

Access Force

Knowledge Force

Evolved Base Force



Pervasive Littoral Awareness

Total Force Network: Navy, Coalition, Joint

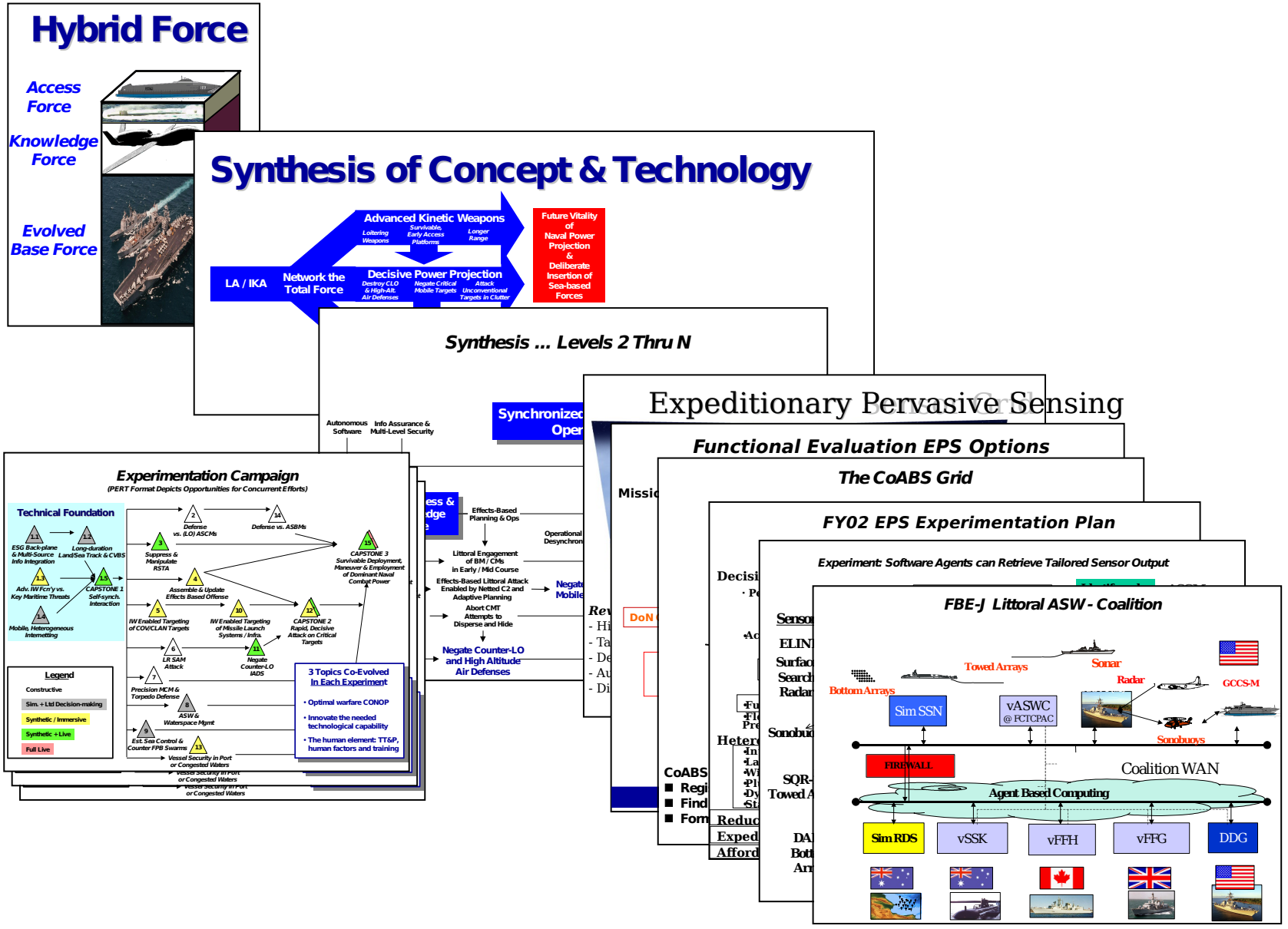
Self-Synchronized, Effects-Based Information and Kinetic Operations

Destroy the "High Threat - Low Density" Anti-Access Defense In the Transition-to-War

Paralyze Adversary Leadership and Forces

Deploy the Total Force and Terminate the Conflict on Our Terms

Analytic Foundation For Transformation Roadmap



Littoral Combat Ship

Concept of Operations

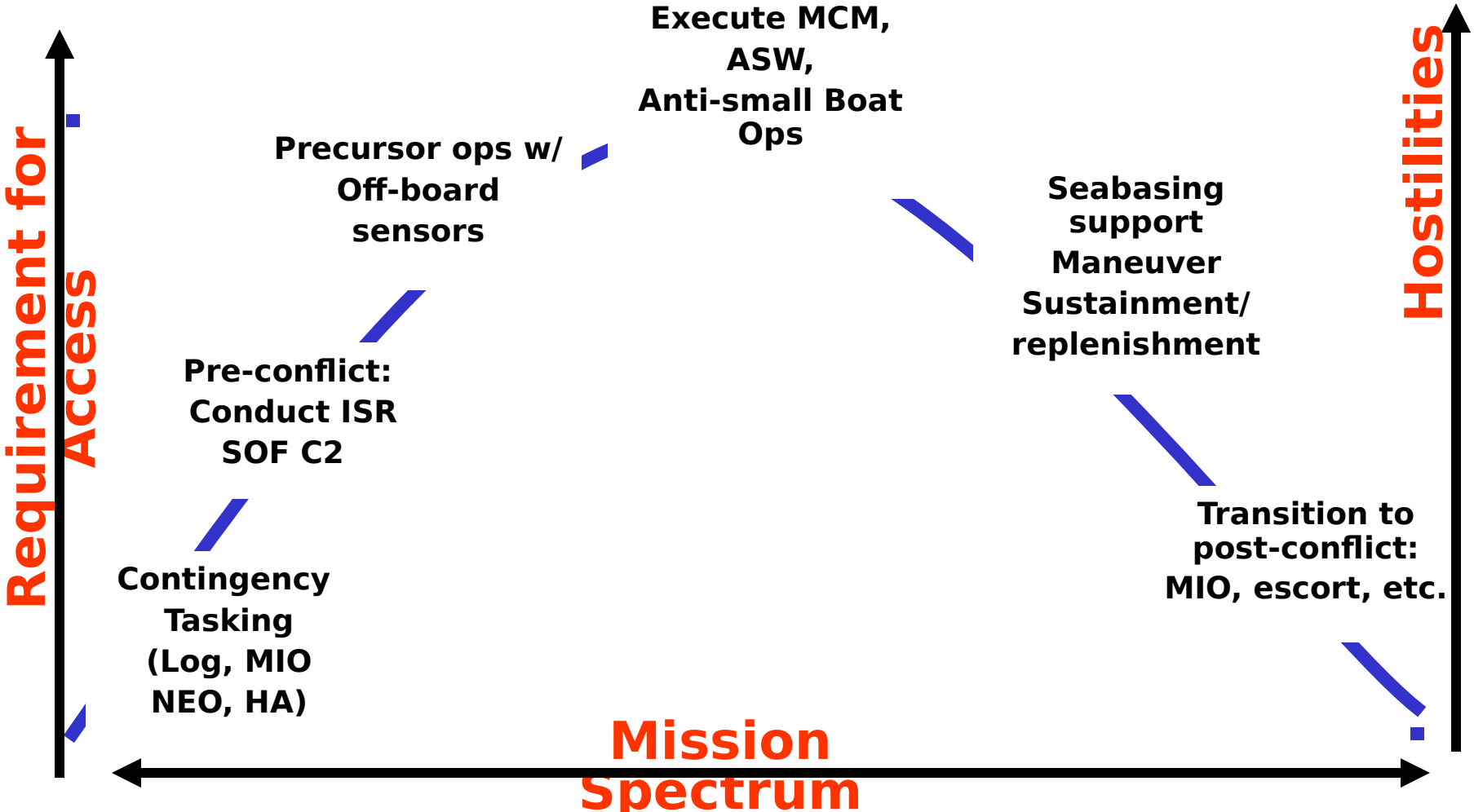
LCS a Sea Power 21 enabler

- ***SEA STRIKE***
  - Performs *persistent ISR*
  - *Enable Forced Entry* for *Joint Power Projection*
  - Engage in power projection w/ *USMC (STOM) and SOF (covert strike)*
- ***SEA SHIELD***
  - Provides *assured access for Joint Forces* by conducting MIW, littoral ASW, SUW, ISR, and SOF support missions
  - Support *Homeland Defense* thru MIO and ISR roles
  - Provide *Sea / Littoral Superiority* by conducting MIW, Littoral ASW, SUW and ISR missions
- ***SEA BASING***
  - Projecting persistent *Offensive and Defensive Power*
  - Provide security for *Joint Assets* & enable sea-based forces
  - Maneuver element for joint mobility and sustainment

LCS will cover the breadth of its mission through the use of interchangeable, tailored mission modules

LCS CONOPS

Tailorable access force provides capability across a broad spectrum of missions



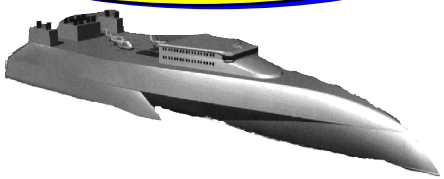
LCS Attributes

Complements DD (X), CG (X) & in-service AEGIS fleet

Core Capabilities

Modular Mission Packages

Speed, maneuverability & responsiveness



Draws upon the capabilities & fire power of multimission ships

- High payload fraction
- Open architecture
- Off-board systems
- Networked

Fully netted with the Battle Force

Stealth, signature management & shallow draft

Self deploying & self sustaining

Employ unmanned air, surface & undersea vehicles

LCS collective versatility

"Based on…"

Experimentation at Sea. (HSV, Skjold, Visby,Triton)

Results of Global War Gaming, & FBEs.

Fleet Input & Responses.

Focused LCS Workshops.

Studies & Analysis

LCS Development Issues

- **Focus is on LCS attributes and warfighting capabilities**
  - **Mission package development, employment and logistics support considerations**
  - **LCS platform interface requirements for mission packages**
  - **Network and autonomous off-board systems development and integration**
  - **Signature reduction, innovative materials, hull forms, propulsion**
- **But Organizational Innovations are still required**
  - **Innovative crewing methods for core/module missions**
  - **Mission planning and training**
  - **C2 for spectrum of missions and employment options**
  - **Maintenance support**

Experimentation will play a critical role in filling the "gaps" in LCS development

LCS Trade Space

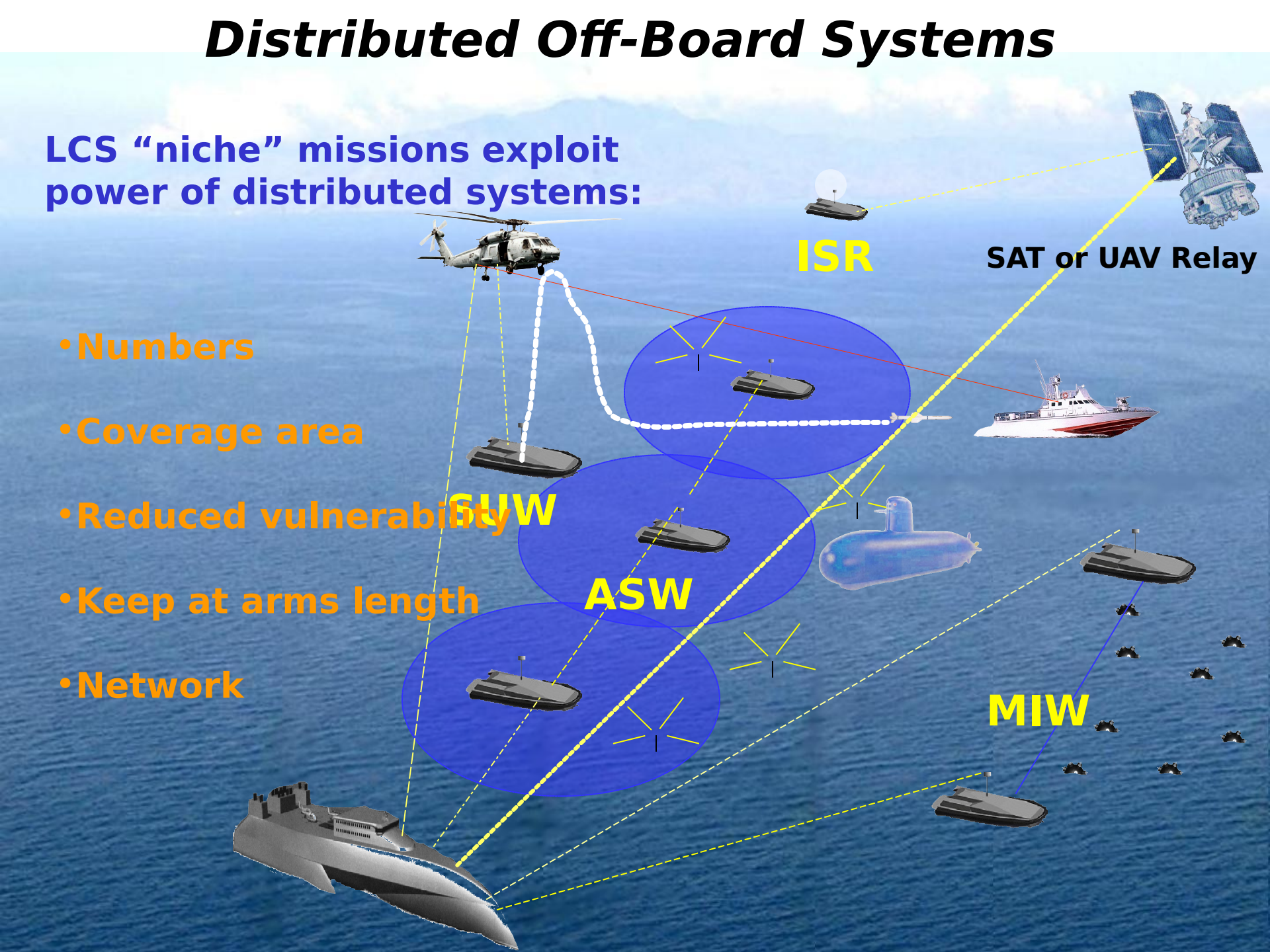
- **Hullform**
- **Seakeeping**
- **Speed**
- **Endurance**
- **Displacement**
- **Draft**
- **Payload fraction**
- **Construction material**
- **Signature**
- **Cost**

Experimentation and studies define the trade spa

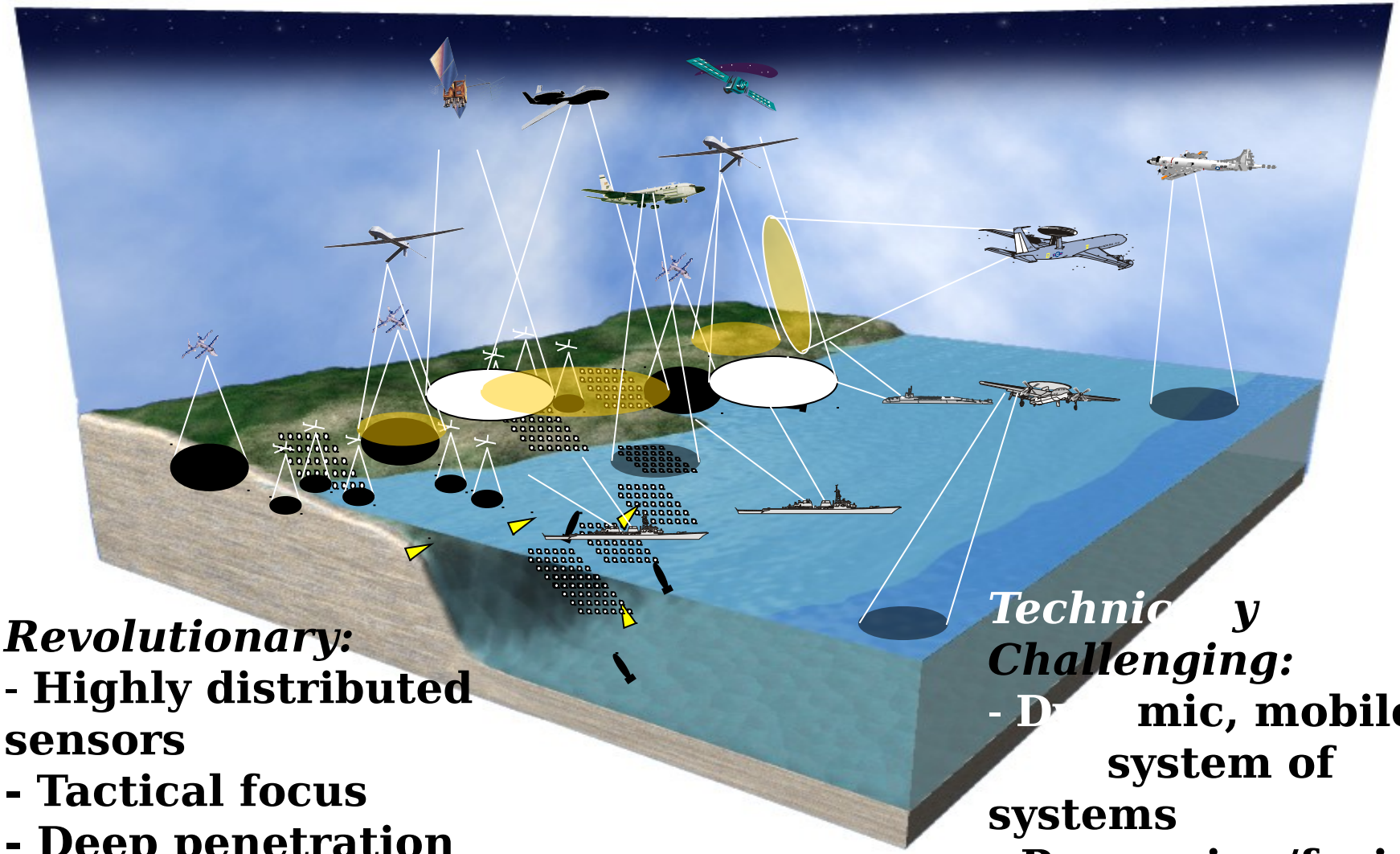
Distributed Off-Board Systems

LCS "niche" missions exploit power of distributed systems:

- **Numbers**
- **Coverage area**
- **Reduced vulnerability**
- **Keep at arms length**
- **Network**



Expeditionary Pervasive Sensing



Revolutionary:
- Highly distributed sensors
- Tactical focus
- Deep penetration
- Autonomous operations
- Distributed C2

Technic y Challenging:
- D mic, mobile system of systems
Processing/fusion
- Actionable information

EPS Analyzed to Understand What Is ...

Needed

Assess the Baseline

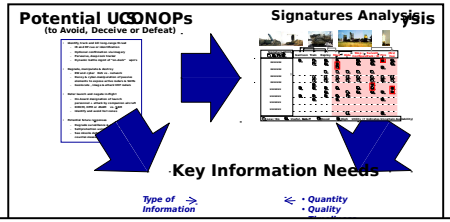
Peace — Crisis — Conventional Conflict — Strate… Deterre…

- *Strategy-to-Task and Functional Decomposition Analysis*
- *Quantitative Forecast of Naval Combat Power "From the*

Prioritize Gaps & Opportunities

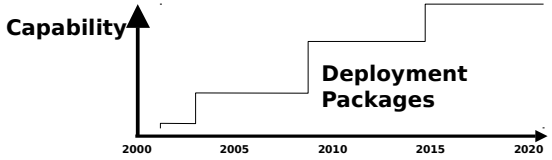
Tier 1		
Tier …		
Tier …		

Derive CONOPs, Signatures & Needs



Achievable

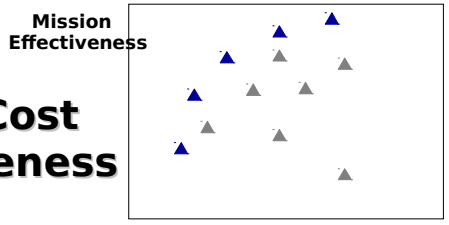
Develop & Execute EPS Evolution Strategy



Develop Integrated Solution Options

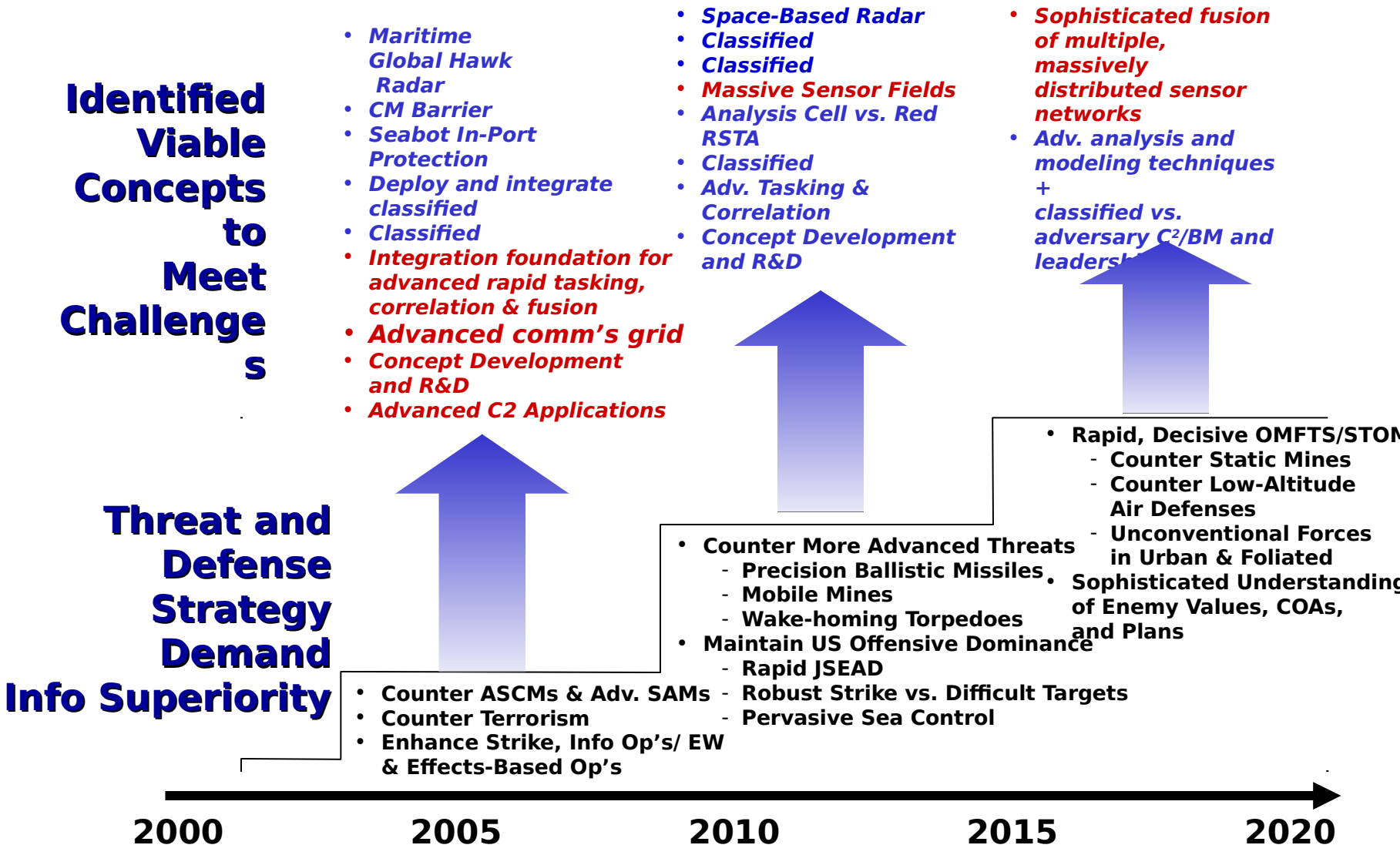
Joint / National	*Distributed*
Mod'ed Pgm's	*Organic to Platforms*

Evaluate Cost & Effectiveness

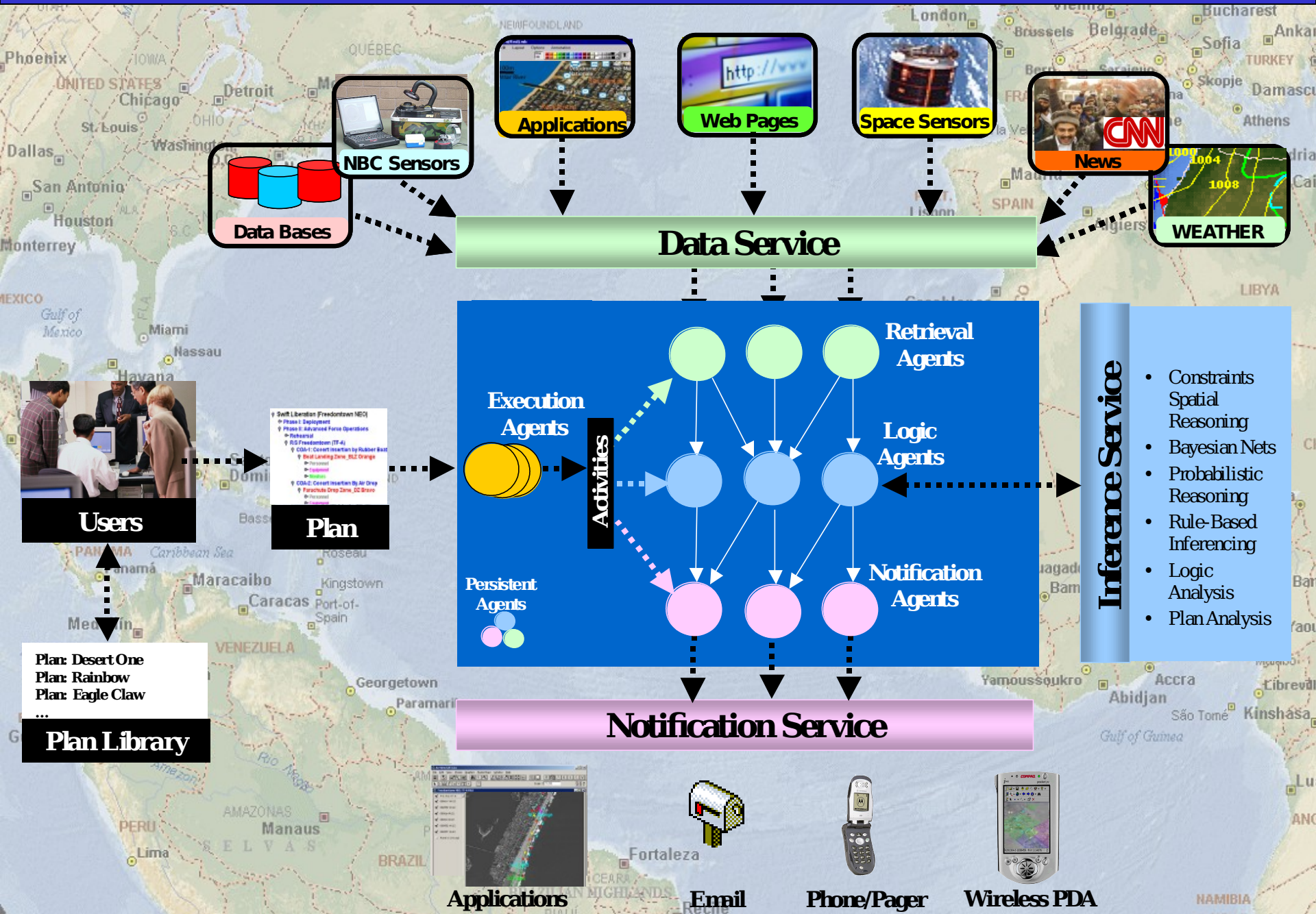


Affordable **Possible**

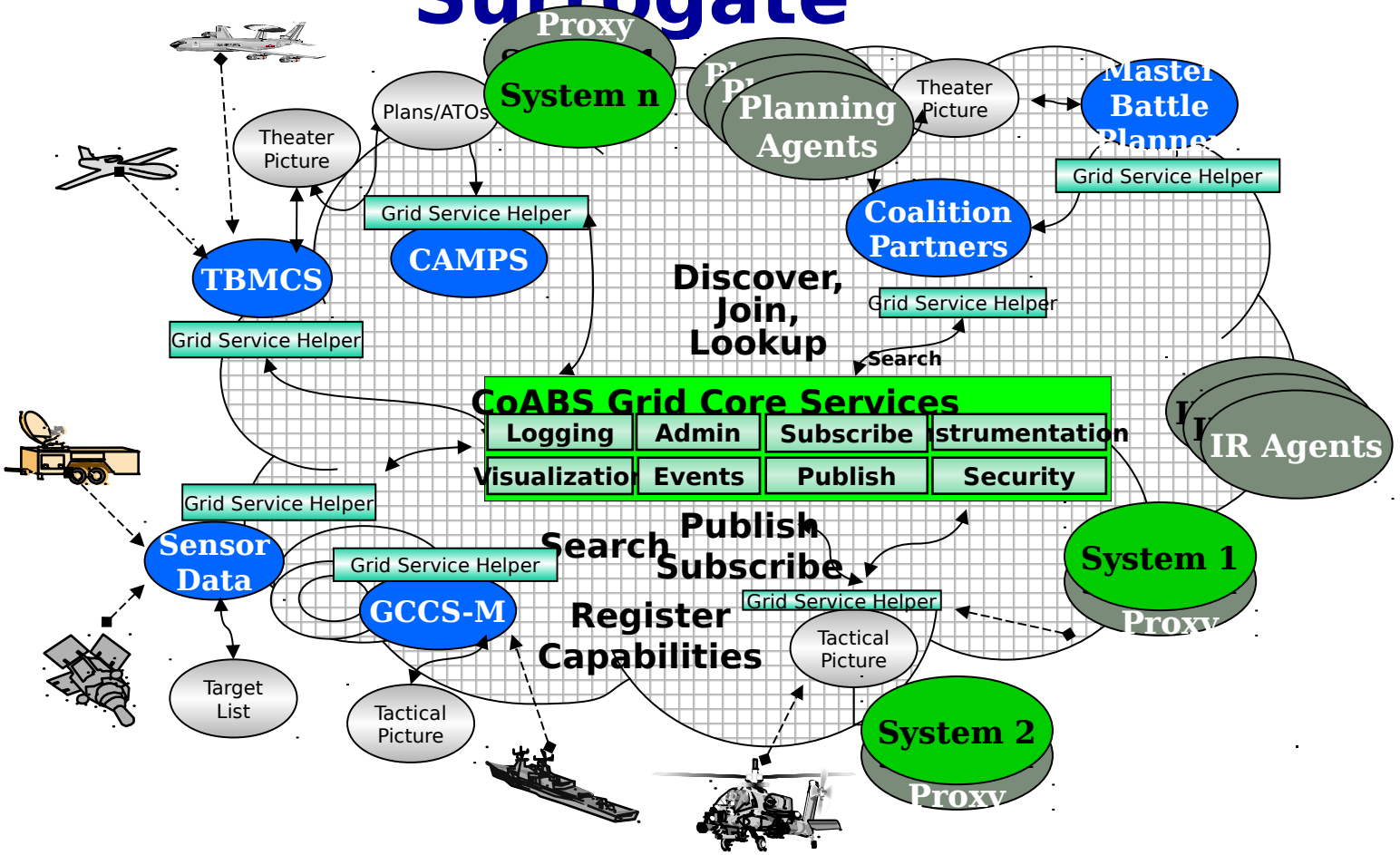
EPS Sensor/IT Implementation Strategy



EPS Reference Model



The CoABS Grid, Agent Based Computing…Experimental Surrogate



CoABS Grid allows heterogeneous agent and legacy systems to:

- **Register themselves & needs**
- **Advertise their capabilities**
- **Find available resources**
- **Communicate among themselves**
- **Form task-based teams**
- **Encrypt conversations**

The NETWARCOM FORCEnet Requirements Domain

Reqmnts Layers		Sea Strike		Sea Shield			Sea Basing	
1st	Battlespace Effects & Capabilities	GWOT	USW	TAMD	TCT	IO	EXW	SPC
2nd	Enabling Effects & Capabilities		ISR	C2		Comms		
3rd	Warfighting Integration	Focal Point →		"FORCEnet"				
4th	Vehicle / Media (i.e., physical)	Backbone		Space			RF	
5th	Sustainment	CND	NETOPS		ILS	Training		

To understand what capabilities the layers underneath must provide, we must understand the important requirements imposed on them by the layers above them

NETWARCOM FORCEnet Guideposts

- **Guidepost #1: Dynamic and Adaptable C2**
- **Guidepost #2: Sensor to Warrior**
- **Guidepost #3: On-demand, QoS Comms and Networking**
- **Guidepost #4: Network Capacity as Enabler Vice Constraint**
- **Guidepost #5: The 21st Century Warrior**
- **The Master Guidepost: Concept-based, integrated requirements**

IKA Taxonomy

Legend

- Continuation of previous experimentation
- New experimentation for FY03

04. IKA

04.01 Pervasive Sensing

04.01.01 - Large Numbers (>10000)

04.01.02 - Low cost

04.01.03 - Distributed

04.01.04 - Autonomous

04-01-05 - Multiple Phenomena

04.01.06 - Continuous coverage

04.01.06.01 – Subsurface

04.01.06.02 – Surface

04.01.06.03 – Air

04.01.06.04 - Cyber space

04.01.07 - Standards based output

04.01.08 – Connected

04.01.09 – Remotely Operated .....

04.02 Networks and Networking

04.02.01 - Web addressable network architecture

04.02.02Universal access

04.02.02.01-Tactical (LTNs)

04.02.02.02-Operational (LANs)

04.02.02.03-Strategic (Enterprise)

04.02.03 - Fault Tolerant

04.02.04 - LPD/LPI Comms

04.02.05 - Quality of Service

04.02.06 - Multiple, redundant comm paths

04.02.07 -Mobile/Expeditionary

04.02.08 - Scalable

04.02.09 - Trusted

04.02.10 - Always available

04.02.11 - Standards based protocol

04.02.12 - Next generation internet like

04.02.13 – Adaptable to C2 needs

04.03 Information Management

04.03.01 – Agent based computing

04.03.01.01- Data mining

04.03.01.02 - Filtering

04.03.01.03 - Association

04.03. 01.04 - Analysis

04.03.01.05 - Alert

04.03. 01.06 - Prediction

04.03. 01.07 - Decision support

04.03. 01.08 - Assimilation

04.03.02 - Common, intuitive user interface

04.03.033 - Common, intuitive info representation

04.03.04 - Real time processing

04.03.05 - Reach back

04.03.06 - Semantic data markup

04.03.07 – Fusion

04.03.08 – Trust/Pedigree

04.04 Dynamic C2 (BMC2)

04.04.01 - Distributed commanders

04.04.02 - Well understood ROE

04.04.03 - Well understood commanders intent

04.04.04 - Situation specific training

04.04.04.01 - Adversary's Region

04.04.04.02 - Adversary's Culture

04.04.05 - Robust team rehearsal

04.04.06 - Collaborative planning (Naval, Joint, Coalition)

04.04.07 - Access to information (Naval, Joint, Coalition)

04.04.07.01 - Based on need vice comms/computers

04.04.08 - Reduce reaction time

04.04.09 - Cognition

04.04.09.01 –

04.05 Information Assurance

04.05.01 - Defensive IO

04.05.01.01 - Strong computer network defense

- Hardware
- Software
- Processes
- Procedures

04.05.01.01 -Intrusion detection

04.05.02 – Offensive IO

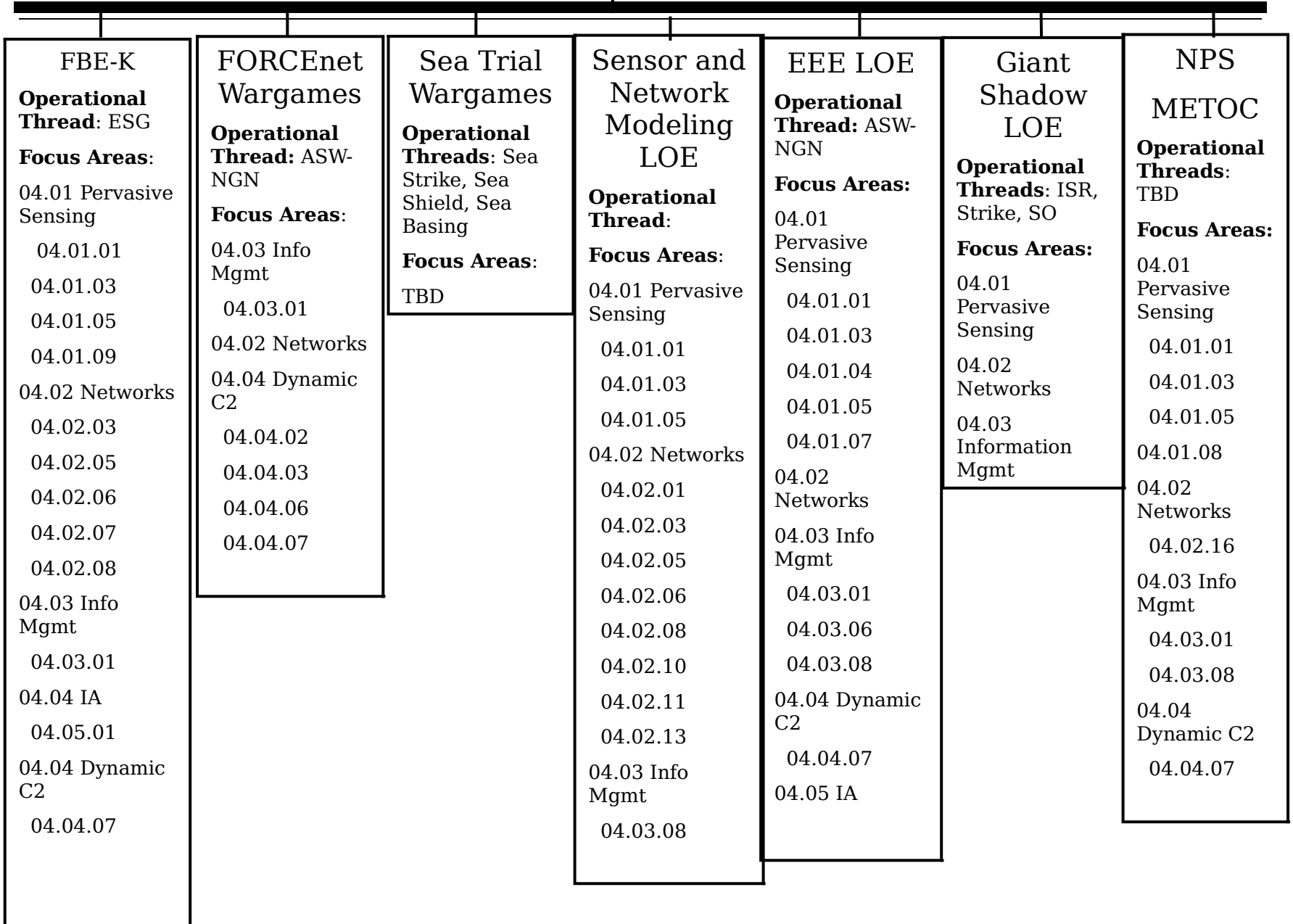
04.05.02.01 - Non kinetic fires

04.05.02.02 - Cyber weapons

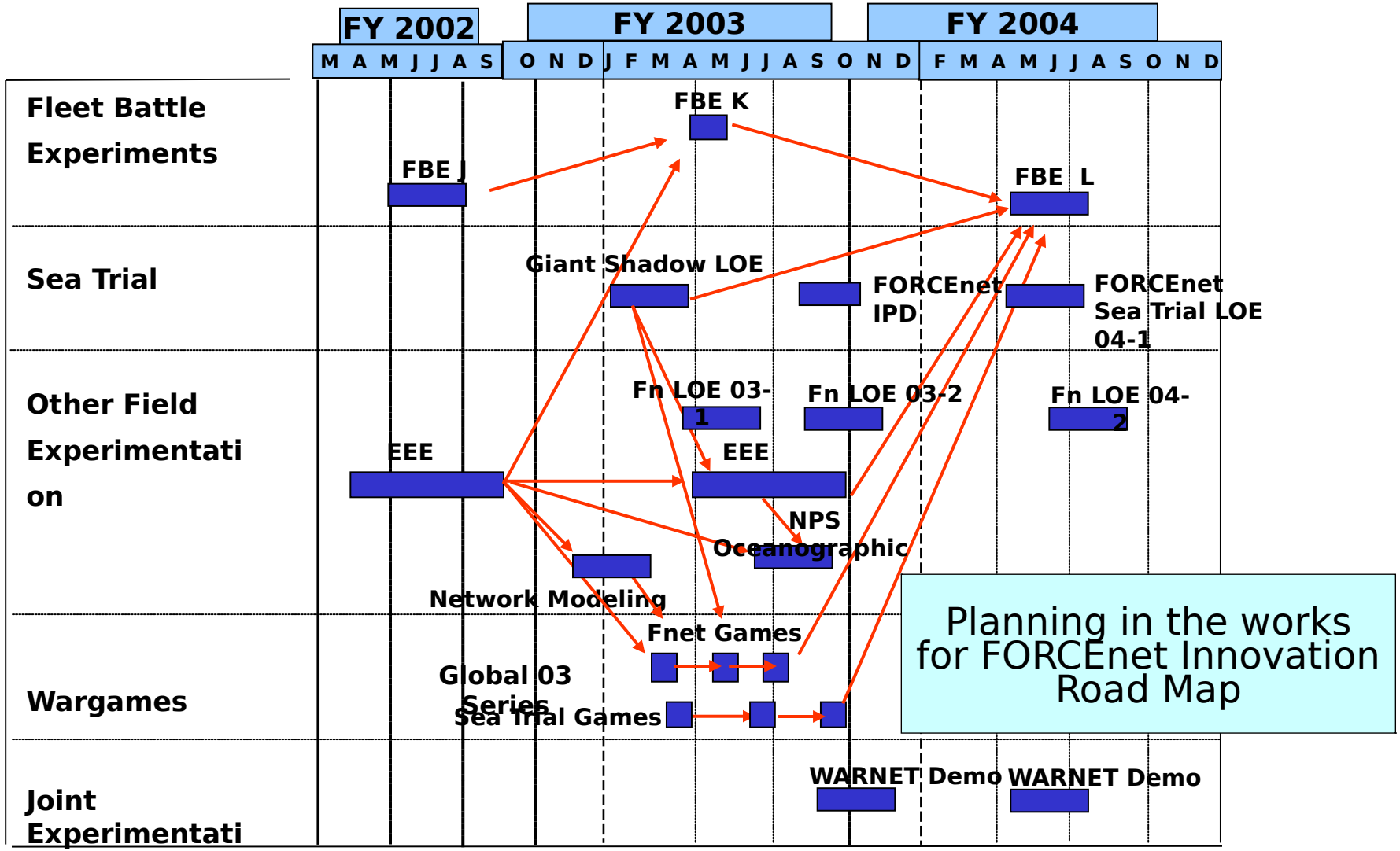
04.05.02.03 - Electronic warfare

04.05.03 Quality of Service

FORCEnet Sea Trial 03 Events and Focus Areas



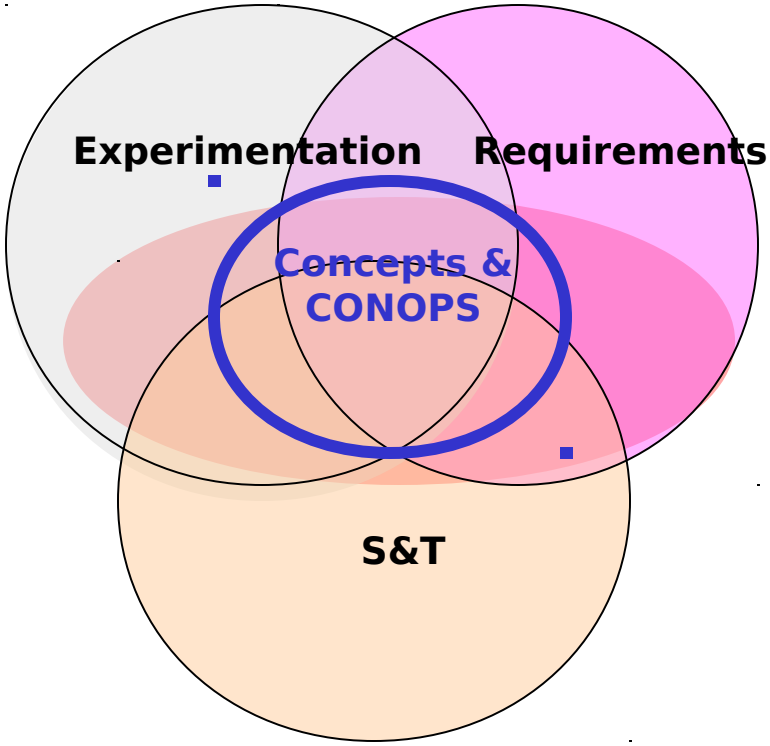
Innovation Continuum



Draft Working Papers – Subject to Change

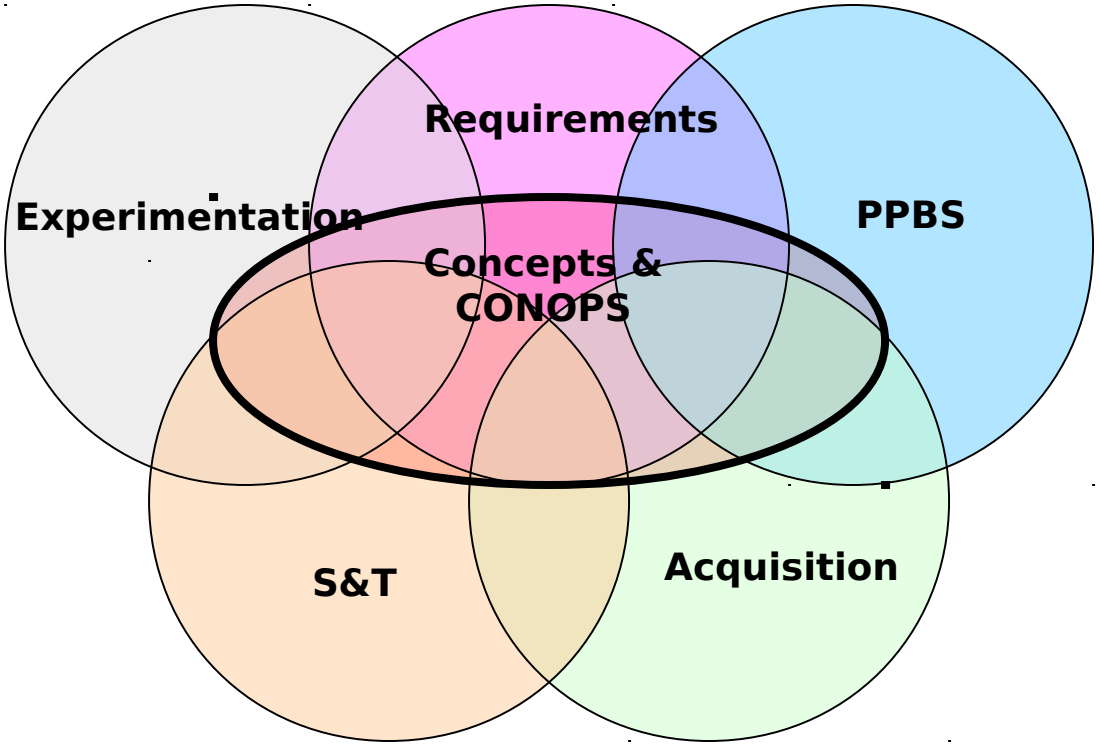
Imperative for Sea Trial Success

Aligns Processes Intended to Accelerate Delivery of Required Capabilities to the Fleet



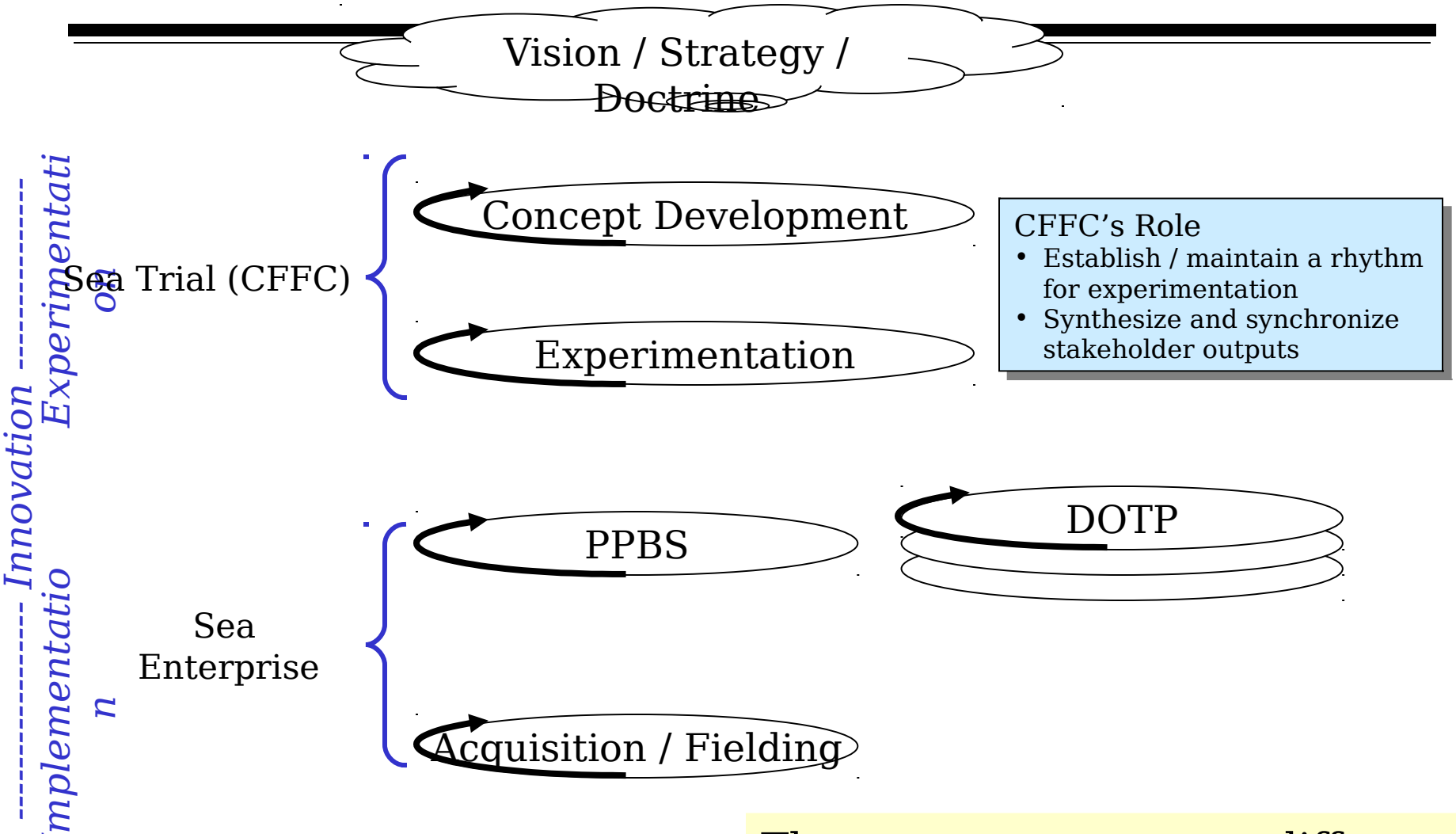
Formalizes the role of Fleet-led, Concept-Based Experimentation in the Navy's decision support systems

Additional Sea Trial Alignment Possible



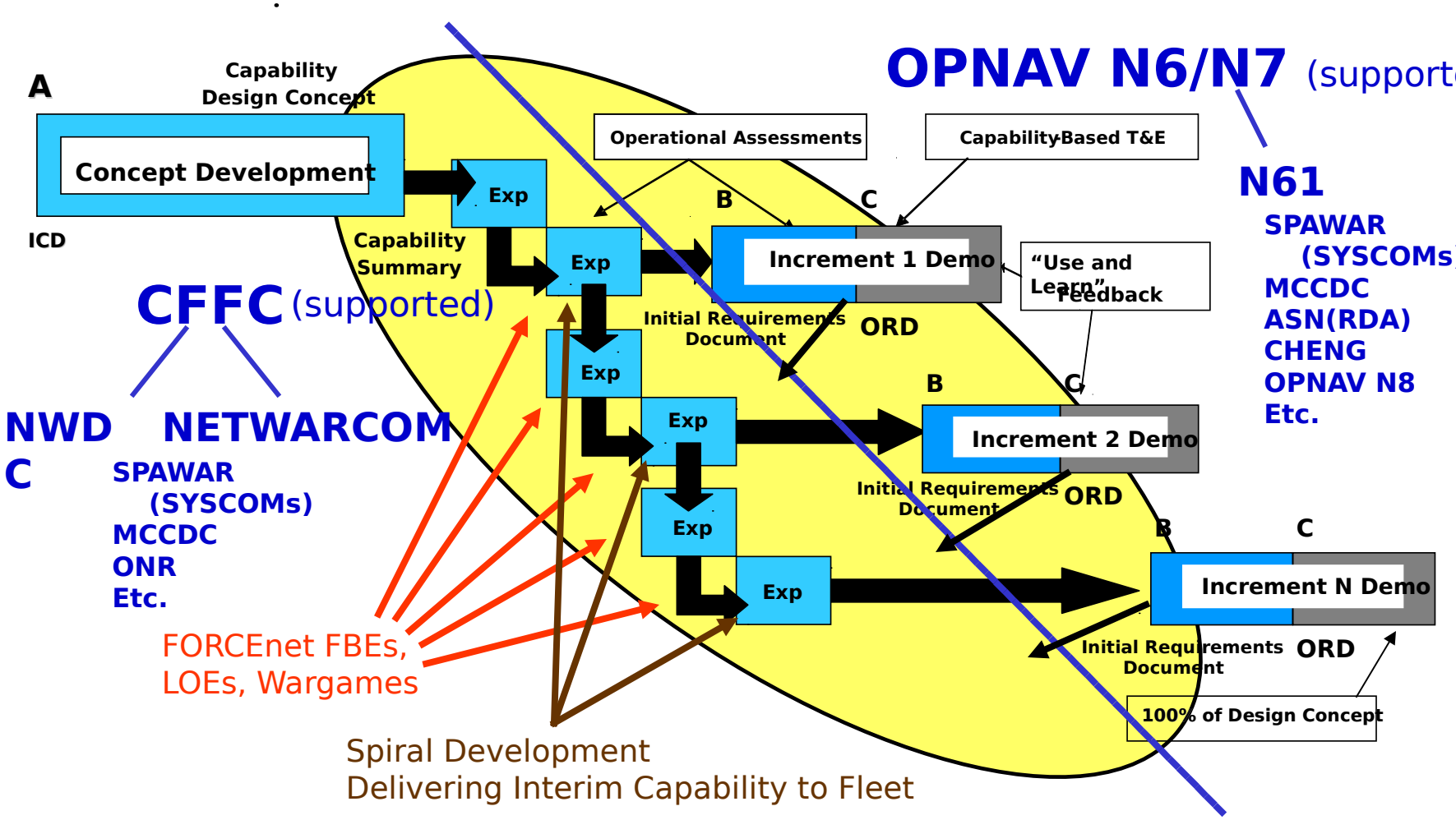
Provides a better foundation for Fleet operational requirements input to OPNAV and acquisition community

Transformational Process Rhythms



These processes run to different "c
and answer to different rule

Proposed FORCEnet Navy Sea Trial Proce



Take advantage of the new acquisition model …
Apply it to Sea Trial

QUESTIONS/DISCUSSION??